Volunteer Firemen

Professional Journal of the Volunteer Firemen's Section of the National Fire Protection Association

Volume 1, Number 2 | BOSTON, MASSACHUSETTS | November, 1933

New Orleans Item-Tribune

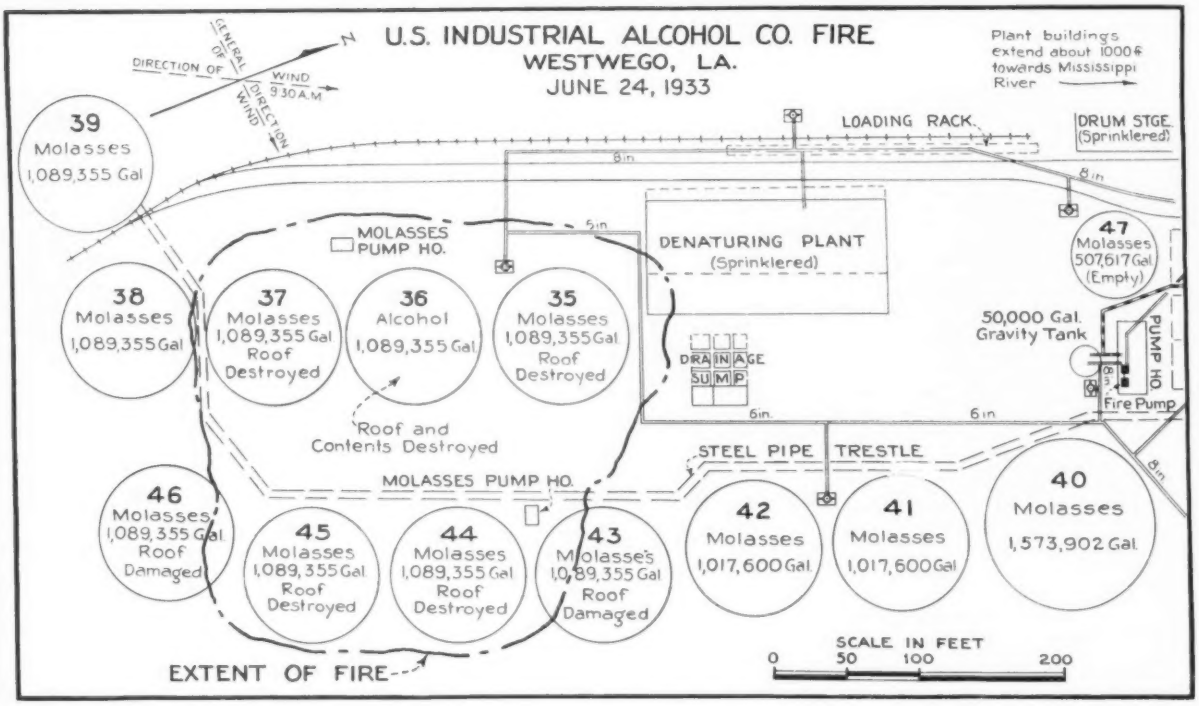
Alcohol—1,000,000 Gallons

Spectacular Tank Fire Handled Well by Volunteers at Westwego, Louisiana

A SPECTACULAR fire, originating in a million-gallon alcohol tank, destroyed the tank and its contents and badly damaged several adjoining molasses tanks at the plant of the U. S. Industrial Alcohol Company, Westwego, Louisiana, on June 24, 1933. The fire was fought almost wholly by the volunteer fire departments of Westwego, Louisiana and four neighboring communities. The fire was commendably handled in spite of the unusual difficulties it presented. The following facts about the fire are from the report of S. G. Peters, Engineer, Louisiana Rating and Fire Prevention Bureau (member N.F.P.A.)

Description of the Property

The property involved in the fire consisted of a group of storage tanks which formed part of an alcohol distillery and denaturing plant. Thirteen storage tanks (Nos. 35 to 47 inclusive), ordinarily used for the storage of molasses, and having a capacity from a half million to a million and a half gallons each, were located in the yard adjacent to the denaturing building. These tanks were of steel construction, resting directly on the ground. All tanks had roofs of wood sheathing on wood rafters and were covered with metal and composition roofing. A wooden cupola (provided with wire screen) at the peak of the roof served as a vent. The tanks were not protected against lightning. At the time of the fire, tank No. 36 contained approximately 1,000,000 gallons of denatured alcohol. The remaining tanks contained molasses except No. 47, which was empty.



All major buildings of the plant were equipped with a wet pipe automatic sprinkler system. Eleven two-way hydrants fed by 6- and 8-inch water mains on a loop system constituted private outside protection.

A ditch from which two pumpers took suction was about 3 feet deep and 2 feet wide and was supplied with water from overflowing a well reservoir about 150 feet from where the pumpers were stationed. This reservoir was supplied by two deep well pumps, one of 800 G.P.M. capacity and the other of 1000 G.P.M., furnishing plenty of water for the pumpers.

Story of the Fire

The fire occurred at about 9:17 A.M., during a thunder shower. There was a sharp flash of lightning, immediately following which the alcohol in tank No. 36 burst into flames. The exact cause of ignition is not known, although the start of the fire was observed by a man on the roof of a near-by tank, No. 43. It may have been a local discharge between the metal on the wood roof and the steel sides of the tank or between objects adjacent to the tank. It may have been a direct discharge to the roof of the tank.

Plant employees, twenty-one in number, were immediately summoned, hose lines were run out from plant hydrant, and the fire pump was started. The Westwego fire department was called at 9:20 A.M. and a pumper and hose truck responded promptly. Pumpers from four other near-by communities also responded to calls for assistance and arrived at intervals up to 9:50 A.M. Two of these pumpers took suction from the private hydrants at the plant, one took suction from a ditch near the pump house and two took suction from hydrants of the city water system on the highway southwest of the property. The pumpers ranged in capacity from 250 G.P.M. to 600 G.P.M., and of the hose lines employed at least four exceeded 900 feet in length. At 12 o'clock noon a 750 G.P.M. pumper from New Orleans arrived and took suction from the ditch near the pump house, supplying a single 600-foot line. There were from eleven to twelve good hose streams in use during the fire.

By the time the firemen arrived, flames were leaping into the air 50 to 75 feet above the top of the tank, and realizing the futility of attacking the burning alcohol tank with water they directed their efforts to protecting surrounding property. The wind at this time was from the southwest, carrying the heat and flame toward the denaturing building, which, among other contents, contained forty-five 100-gallon drums of ether, one hundred and fifty 50-gallon drums of denatured alcohol and 30,000 to 40,000 gallons of alcohol in mixing tanks. Hose streams were directed on the roof and exposed walls of this building, and twenty-five heads on the sprinkler lines in the exposed end of the building were opened by an employee who knocked out the fusible links. Drums of alcohol and ether were removed from the ground floor, but it was not deemed feasible to remove those on the upper floor.

With no safe place on the premises to pump the alcohol for salvage purposes, an attempt was made to extinguish the flames by use of foam. Three foam generators were connected to some equipment hastily assembled and foam was applied for about twenty minutes with 9700 pounds of foam powder being used. The foam seemed to force the seat of the fire toward the side of the tank opposite which application was being made, but the alcohol dissolved the foam so rapidly that the foam blanket could not be sustained long enough to have any effect in extinguishing the burning liquid.

The roofs of tanks Nos. 44 and 45, which had not burned up to this time, ignited and were destroyed. The fumes and smoke from the burning molasses and the intense heat greatly hampered

the firemen, who directed their hose-streams on the fire from behind improvised shields. The firemen, with the exception of the companies from Algiers and New Orleans, were practically all volunteers, and their work in face of the difficulties encountered is to be commended.

With the alcohol diluted and discolored by water and foam and still furiously burning, it became evident that there would be very little salvage. Therefore, in view of the potential danger to the plant it was decided to pump alcohol from the tank into the Mississippi River until water from hose streams played into the tank diluted the alcohol remaining to a point where it would no longer burn.

By use of a molasses pump and a connection from the tank to the molasses line approximately 25,000 gallons of alcohol were pumped into the river.

The fire was finally extinguished at 6 A.M. on June 25.

New Orleans Item-Tribune

Airplane view of the plant of Industrial Alcohol Company, Westwego, Louisiana. Note congestion of plant property and fire spreading to roofs of other tanks in the vicinity.

Fighting Fires in Dwellings and Small Stores

By Frank C. McAuliffe (Member N.F.P.A.)

Chief, Fire Insurance Patrols, Chicago

CRAFTSMANLIKE fire fighting is not limited to the large city or the paid fire department. It is the result of fire officers and men knowing how to do their job. This can be well illustrated by reviewing two types of fire which present substantially the same problem whether they occur in the large city or the small community. Fires in dwellings and fires in small stores constitute a major portion of the work of any fire department and the proper method of handling these fires should be well understood.

Proper procedure should be followed from the moment the fire apparatus leaves the station. The firemen of our country are so imbued with the spirit of competition and speed that serious accidents have occurred almost daily since the motorization of fire departments. The fire officer who makes certain of an alarm location and proceeds with safe and sane driving will arrive with a company prepared for action. The excitement incident to dangerous speed will be lacking and the officer will be in a state of mind to plan his attack in a cool and deliberate manner and his men will carry out their orders similarly. "Haste makes waste" is a saying that should be posted on every fire department bulletin board in the country.

Residence Fires

Upon arrival of a company at the ordinary residential fire the officer in charge should use care in forcing entrance if that is necessary. Many a valuable entrance door has been ruthlessly demolished to save a pan of food burning on a stove. The extent of the fire should determine the method of operation. The majority of residential fires can be extinguished by hand pumps or extinguishers and in only occasional cases would it be necessary to use anything larger than a 1½-in. line. The fire officer should appreciate that inside operation of hose lines is most desirable and that he may as well allow the building to burn to the ground as to wash it from its foundations.

If it is hot and smoky and impossible to advance upon a fire to a position where fire can be seen, the officer in charge should not allow the pipe to be opened. He should have the building ventilated by lowering the windows from the top and raising them from the bottom. If the fire has extended to or originated in an attic space and it is impossible to advance the line into that space, the roof should be opened directly over the fire to allow the heat and gases to rise and allow the line to be advanced.

Unnecessary ventilation is generally unnecessary destruction, and roofs should not be opened or windows broken unless that procedure is necessary. When it is necessary to open a roof a clean cut square hole of sufficient size should be made in preference to chopping out several small holes. Repairs can then be made more easily and temporary protection from the elements is a more simple matter.

Every fire officer should take pride in his work and handle a residential fire, with the often irreplaceable family possessions involved, as he would a fire in his own home. If he has a fire in concealed spaces it is not necessary to pull pictures to the floor, trample on draperies, de-

stroy lighting fixtures, pull plaster down upon the rugs and furniture and in general wreak havoc upon the building and contents. Feeling the walls and by the heat determining the location of the fire, picking up the rugs, carefully removing or covering the furniture, and opening the walls or ceiling in a sensible manner, are marks of good fire fighting.

In the event of an attic or upper floor residential fire where it is necessary to use a fire stream, one or two men can usually be spared, particularly after the line is stretched and water is available. These men should go below, remove all clothing from clothes closets, rugs, curtains, draperies and pictures that may be subjected to water damage; place them on beds and furniture which in turn should be brought together and covered with a salvage cover. Such work should be started immediately under the fire and extended to other rooms as the need requires.

After the fire the floors should be cleared of water by mopping or squeegeeing to prevent warping. Debris should be gathered together, and plaster, laths and such other waste material should be thrown out. Partially burned furnishings should be placed in a salvage cover for possible salvage.

Fire officers should have a knowledge of modern methods of temporary roof protection, and if holes exist they should receive the proper attention.

In extremely cold weather an effort should be made to maintain heat and prevent loss to plumbing and heating fixtures. If that procedure is impossible all pipes, fixtures and tanks should be drained.

Every possible effort should be made to make the premises livable for its occupants, as such work will give firemen the good will of the citizens they serve and ultimately redound to their benefit.

Small Store Fires

Assuming the usual small store with an apartment above the method of operation depends largely upon the location and extent of the fire. If the building is heavily charged with heat and smoke, no time should be lost in forcing entrance. It is presumed that men are sent to the apartment to assure the safety of the occupants and to ventilate. Breaking the glass panel in the entrance door under those conditions is advisable. Attempting to force heavy entrance doors by other means usually results in broken door frames and fittings with the glass panels cracked or broken in the final analysis.

International

After a serious fire in a group of the small store buildings which are typical of those with which the fire departments of most towns and villages have to contend.

An effort must then be made to locate the fire. In the event that the heat and smoke make that impossible, further ventilation must be made. The transom over the door can be lowered or broken and men sent to the rear to break a window or force a door.

Should the fire have originated in the basement and extended so as to make it impossible to advance a line down the stairway, immediate steps must be taken to ventilate the basement. Basement windows, coal hole covers and deadlights are common means of basement ventilation. Sufficient first floor ventilation must also be made to permit men to stay on the floor and to prevent communications through vertical openings and concealed spaces. If it is necessary to break plate glass windows it may be possible to remove the contents of the show window before that work is done. Show window partitions should, in that case, be removed or opened to permit unobstructed ventilation.

Men should immediately be sent to adjoining basements to make sure the fire is not spreading, to open sewer drains and where necessary to get stock off the floor on skids if possible to forestall water damage.

A hole should be made directly over the fire and a distributing nozzle or a basement pipe inserted. Efforts should be continually made to advance a line down the stairway, deadlights, windows or other entrances, and, as soon as that procedure is possible the basement pipe or distributing nozzle should be shut down and the company or companies advanced upon the fire. Careful use of water on the first floor is essential to prevent unnecessary loss to the contents on that floor.

Officers must determine the floor load, type of floor construction and intensity of the fire, in order to guard their men against the collapse of the first floor. Broken deadlights and holes cut in the floor should be covered to prevent men from walking into them.

Frequently broken gas lines in basements burn fiercely after most of the fire has been extinguished and officers should be careful not to extinguish the flame with the streams until ready to shut off at the meters or plug the openings. Escaping gas is considerably more dangerous in such places than a free burning flame.

Very frequently, streams from the front and rear of a basement force the heat and gases against each other, making it impossible to enter. As soon as possible, streams should be shut down either in the front or rear and an effort made to go through with streams from one end, driving the heat and gases out as they advance.

Basement drainage should be given attention, as the water may extend into adjoining buildings and damage basement stocks. Placing a siphon in the basement, using a pumper direct or breaking soil pipes are common methods of procedure.

When overhauling, care should be used to prevent additional damage and all possible assistance should be given the owner to prevent additional loss by rain, snow or extremely cold weather.

Maintaining Hose and Apparatus

Effectiveness of Equipment at Fires Depends Upon the Attention It Is Given

IT IS no use to have fire apparatus and equipment if lack of attention to some detail of maintenance makes its use at fires impossible or ineffectual. The following suggested rules on maintenance have been prepared primarily for the conditions peculiar to volunteer fire departments. They are the work of a distinguished group of fire protection authorities, members of the Committee on Farm Fire Protection of the N. F. P. A., of which David J. Price of the United States Department of Agriculture is chairman. These suggestions are for the care of apparatus between fires. They do not cover its proper use at fires nor the cleaning of hose and apparatus afterward.

Maintenance of Motor Apparatus

The motor shall be tested at least once a week by operating it for a period of at least twenty minutes. Twenty minutes will insure sufficient heat to evaporate gasoline left in the cylinders and prevent dilution of crankcase oil. This test should preferably be conducted in the open, but if impractical at least one set of doors of the engine house shall be open during the test. This is because the products of gasoline combustion may prove fatal in improperly ventilated structures.

The brakes should be tested and examined at least once a month and also after every run.

Manufacturer's instructions with respect to lubricating apparatus should be very closely followed.

Storage battery solution should be tested once each month and during the summer months examined weekly to see that plates are covered.

The pump unit of motorized pumpers shall be tested at least once every two months to see that all parts are in an operable condition.

All unused extinguisher equipment shall be discharged and recharged annually in accordance with the extinguisher manufacturer's instructions. During such operation of the equipment, fire conditions should be simulated.

Maintenance of Hose

In order to get fire streams at work with minimum delay and also to guarantee the condition of the hose being such that there will be no apprehensions as to its ability to stand up under the stress of severe fire conditions, it is necessary to:

a. Buy and install approved hose.
b. Protect hose in a suitable manner.
c. Give hose constant attention.

"Approved" hose generally refers to hose labeled by Underwriters' Laboratories, Inc., Chicago. Underwriters' Laboratories inspects and tests all makes of fire hose and in buying new hose it is very easy for the purchaser to be sure of a definitely satisfactory quality if Underwriters' Laboratories' label is demanded.

The hose should be well protected from the weather and the ravages of vermin.

Each length of hose should be numbered and a book record kept of the date of purchase, maker, and dates of periodical testing and pressures, also remarks as to condition.

Cotton rubber-lined hose should be carefully tested by means of a power or hand pump to not less than 150 pounds per sq. in. or higher if the normal fire pressure is greater than 100 pounds. This should be preferably done each spring. Any faulty or defective hose, or even doubtful lengths, should be repaired, and if this is not practicable, should be scrapped and replaced at once with approved hose. Before hose is taken away for testing it should be replaced by spare hose, so that the required amount of hose will always be available.

A hose drying rack similar to that shown on this page is recommended. This rack is for drying hose after it has been wet either at a fire or at a test. The rack should be 52 ft. long, 1 ft. high at the lower end and at least 3 ft. high at the upper end. This is a simple and effective arrangement and does away with the necessity of hoisting the hose. The rack facilitates the proper care of the hose, which will tend to prolong the life of the hose and thus reduce the cost of one perishable part of the equipment. The cut shows a rack in three sections, 3 or 4 ft. wide, and with slatted top so that half a dozen lines of hose may be dried at one time.

The hose should be folded in such a way that air can circulate and prevent the formation of mold. Six times a year the hose should be removed from the truck, examined for mold, and rearranged with the folds in different places.

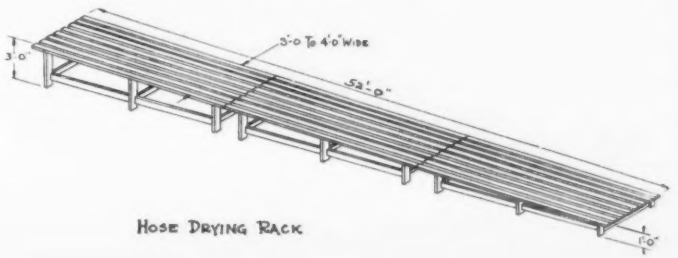
It is most important that sufficient hose be kept on hand at all times to allow for proper testing, overhauling couplings, or the drying of hose after a fire, etc., so that it can be done without having to deplete the amount of hose kept on the truck. This careful treatment will very considerably lengthen the life of the hose and also give assurance that the hose will be in safe and proper condition when needed for fire.

Maintenance of Nozzles and Couplings

Couplings shall be kept in first class order, and each time after the hose is tested, the threads should be run over with a standard tap and die kept for the purpose. They should be so adjusted that they can be easily screwed up by hand.

The rubber coupling washers should also be gone over at this time and renewed as needed, as they deteriorate and break away. Care must be taken to see that the rubber washers do not project into the waterway, particularly at the nozzle coupling, as this will frequently cause a ragged stream.

Bent or battered nozzles or play pipes shall be carefully repaired or else replaced. Bent or battered nozzles should not be used, as the effective reach and fire extinguishing capacity of the stream will be much impaired. The slightest roughness of the tip will sometimes cause the stream to break or spray and become ineffective.



HOSE DRYING RACK

This old, isolated house was burned as a practical demonstration of actual work at fires by the Woonasquatucket Valley (R. I.) Firemen's League. Water was relayed from a pond by several pumpers and the picture shows the good streams obtained using 2½-in. hose and 1-in. nozzles. One stream was used to wet the grass to prevent spread of fire to nearby woodlands.

Field Demonstrations

By Willard B. Hall

Chairman, Engineering Committee, Woonasquatucket Valley Firemen's League

ONE of the most interesting developments in the science of fire fighting in recent years has been the increased use of pumpers and the more efficient utilization of existing water supplies by rural fire departments. These factors have materially increased the efficiency of the departments and have resulted in the saving of property which otherwise might have been a total loss.

Among the many fire fighting organizations throughout the country which have been studying ways and means for greater efficiency in fire fighting and consequent decreased losses in their territory is the Woonasquatucket Valley Firemen's League of Rhode Island. This league, embracing a territory adjacent to the city of Providence, is made up of twelve volunteer fire companies from districts that vary from near city conditions to a crossroads where there are scarcely enough houses to call it a village. An unusual opportunity came to this organization to combine theoretical discussions with practical laboratory experience when the league firemen were allowed to burn two dilapidated old houses that were about to be demolished.

It was necessary if such fire tests were to be a success that study and preparation be made to determine the exact manner in which the tests should be carried out and what specific problems should be studied. An engineering committee for the league outlined the work and made arrangements for time keepers and observers to record all important data.

At the first fire the primary object was to arouse public interest in better fire protection, but the actual tests proved the effectiveness of utilizing small capacity fire department pumpers to relay water from distant supplies. In the first test 2½-inch hose was used and observations were made to determine (1) the greatest practical range of operation at rural fires, (2) the proper system or order in which pumpers should be placed, (3) what results might be expected at a rural fire if the alarm was sounded with reasonable promptness. The second fire was conducted as a test to determine the effectiveness of small hose streams at rural fires where only a limited quantity of water is available. Details of the actual fire tests follow. It is important to note that fire departments taking part were all well qualified as a result of holding practice drills so that they were familiar with their work which insured reasonably effective operation. There were no nearby buildings to be endangered in either of these fire tests and due precautions were taken to prevent the spread of fire to grass or woodland.

The first test took place several years ago when the league obtained an old house near the village of North Scituate, R. I. It was located 2300 feet from a large pond and the engineering committee saw in this layout an opportunity to demonstrate the efficiency of relaying water from one pumper to another to the point of the fire. The primary objects of the demonstration were to arouse interest in better fire protection for the village of North Scituate and to show that by pumping in relay, property at considerable distance from available water supplies could be protected. The run of each pumper taking part in the test was timed, pressures were recorded at frequent intervals and numerous pictures were taken.

Prior to the start of the demonstration pumpers from Harmony, Lymansville and Smithfield companies were stationed at a point a half mile beyond the dam at the reservoir. When the torch was applied to the building, word was telephoned to the pumpers and they were started on their way as to an actual fire. The run to the dam was made, suction thrown overboard, hose laid, the pumpers connected up and water was on the fire in 6½ minutes. The old house, with the windows removed, permitting maximum draft conditions, was well on fire and gave indication of being a total loss. Nevertheless in 33 minutes the fire was out and most of the building standing. Two streams (2½-inch hose, 1-inch nozzle tips) from the last pumper in the line had stopped the fire as quickly as though the house had stood on a city corner instead of about half a mile from the nearest water supply.

As a result of this demonstration, the fire company at North Scituate acquired a new pumper.

From that day on, the firemen were on the lookout for another house. Early in the spring of 1932 another such house was found. As all of the windows and doors, some of the weather boarding and some of the flooring of this house had been removed for salvage purposes, the condition of the building made it impossible to work out problems in ventilation as first planned, so it was decided to make use of it to test the value of 1½-inch hose streams using ½-inch nozzle tips in extinguishing fire with minimum water damage. There had been some hesitancy on the part of some of the companies in the league toward the use of small hose streams for fear that they might result in the loss of a building in an attempt to reduce water damage.

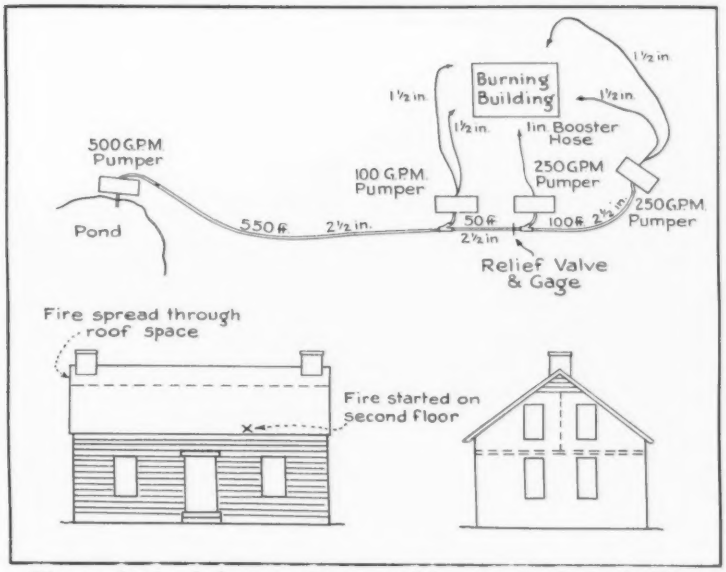


Diagram showing the layout used at a second demonstration fire by the Woonasquatucket Valley Firemen's League. This demonstration was to show the use of 1½-in hose lines on dwelling fires. The pumpers were placed as shown for demonstration purposes only. The 1½-in. lines might, of course, have been supplied with much less pumping capacity.

The fire was allowed to get well under way before water was applied as this picture shows. Four 1½-in. hose lines were enough to bring it under control without severe damage to the lower floor.

The house to be burned was situated on a narrow side road and there was no point to be gained, except realism, in making a demonstration run to the fire. Therefore, the apparatus was placed before the fire was set. A 500-gallon per minute pumper was stationed at a pond near by and 600 feet of 2½-inch hose was stretched to a point near the building. By use of Y-connections the suction side of three small pumpers, one of 100 G.P.M. capacity, one of 250 G.P.M. capacity and another of the same capacity, were connected to this line. A relief valve was provided to take care of excess back pressure when lines were shut down and a gauge was set into the line for recording purposes. From each of two of these pumpers (the 100 G.P.M. and a 250 G.P.M. one) two 100-foot lines of 1½-inch hose were taken off, and from the third, pumping was direct through the 1-inch booster tank hose on the apparatus. The last line was used to protect the shade trees in front of the burning house.

The house was ignited on the second floor. When the fire had reached sufficient proportions so that flames were coming out under the eaves, from the windows at one end and through the wooden shingle roof in two places, orders were given to attempt to extinguish it. This was accomplished by taking hose lines over ladders into the windows and up the stairway. The fire was promptly brought under control but not extinguished as it was desired to continue the demonstration.

The fire was then allowed to continue until the entire second floor and roof were a mass of flames. An attempt was made to extinguish it at this point, but this attempt was also discontinued before definite control had been established. However, it seems probable that with the four streams in operation, this fire probably could have been extinguished without severe fire damage to the lower floor, although the whole second floor would have been gutted and the roof burned off.

After this test, fires were started on the first floor and the building allowed to burn down. The total destruction of the building was part of the contract with the Providence Water Company, who owned the building and who wished to get rid of it.

The tests very clearly demonstrated that 1½-inch hose streams with ½-inch tips can be very effective on residential fires. Their mobility and ease of handling make them particularly adapted to inside work and when a limited number of firemen may be on hand to handle hose streams in the early stages of a fire. The fact that they are economical in the use of water is a distinct advantage in keeping water losses at a minimum and in conserving limited water supplies.

Such practical fire laboratory experiments present almost limitless possibilities for study of any problem which the firemen may want to solve. Moreover, they not only provide an opportunity to make experiments, but are a source of interest to volunteer firemen who gain much practical experience thereby.

Volunteer Firemen

Professional Journal of the Volunteer Firemen's Section of the National Fire Protection Association

Published by the National Fire Protection Association, a voluntary, non-profit organization, 60 Batterymarch Street, Boston, Massachusetts, U. S. A. (Copyright 1933.)

Volume 1 **November 1933** Number 2

Pennsylvania Firemen Endorse Volunteer Section

Through their official organization, the firemen of Pennsylvania have received the Volunteer Firemen's Section idea enthusiastically. Percy Bugbee, Assistant Managing Director of the National Fire Protection Association, described the new organization at the annual meeting of the Firemen's Association of the State of Pennsylvania at Lock Haven, Pa., in October. He appeared at the invitation of President M. W. Tawney, Chief of the Harrisburg Fire Department and a long-time member of the National Fire Protection Association. The following resolution was adopted:

"*Resolved*, that the Firemen's Association of the State of Pennsylvania in session at Lock Haven on October 3, 1933, endorse the action of the National Fire Protection Association in organizing a Volunteer Firemen's Section.

"Be it further *resolved*, that this Association recommends to every volunteer fireman in the state that they enlist in this cause."

With some 1,700 fire companies and approximately 120,000 volunteers, Pennsylvania is one of the principal volunteer states.

Background of the N.F.P.A.

The National Fire Protection Association has a background which makes it peculiarly qualified to take up the problems of volunteer firemen. The Association was organized in 1896 by a group of men interested in reducing the fire losses throughout the United States and Canada. The object of the Association as set forth on its letter-head is the following:

"To promote the science and improve the methods of fire protection and prevention; to obtain and circulate information on these subjects and to secure the coöperation of its members in establishing proper safeguards against loss of life and property by fire."

From its small beginning thirty-seven years ago the Association has gradually grown to the point where it has over three thousand members in all parts of the world. The Association never has become commercial in character and has steadfastly followed its objective of doing everything in its power to reduce loss of life and property from fire. Membership in the Association has never been restricted and any individual or concern interested in any phase of the reduction of the fire loss and fire fighting is eligible to membership. There is no other organization that is similar in character throughout the world. The Association has become the clearing house for all that is authoritative on the subject of the fire waste, fire protection and fire prevention.

Its technical standards by means of which the fire waste may be checked are produced and kept up to date by 37 technical committees dealing with as many different items including such important matters as the following:

Automatic Sprinklers	Lightning
Electric Wiring	Gases
Flammable Liquids	Salvage
Spontaneous Ignition	Pumps
Building Construction	Water Supplies
Farm Fire Protection	Fireproofing
Forest Fire Protection	Extinguisher
Marine Fire Hazards	Garages

These standards are widely used as the basis of state, provincial and municipal legislation, as insurance requirements, and as a guide by property owners.

The work of the preparation of standards and the revision of existing standards goes on unceasingly so that the standards are in step with progress in science and invention. There is no public effort in the history of the nation to which there has been so freely given over so long a period so much thought and painstaking technical investigation as the National Fire Protection Association.

The publications of the Association reflect this background of technical fire experience. By means of a Quarterly Magazine, News Letter, special bulletins and other publications, the Association's members participate in the development of better methods of fire prevention, and through publications written for popular consumption the Association fulfills its function as a disseminator of helpful information as to how the grievous results of the neglect of fire precautions may be avoided. Service to the public is also accomplished through the Association's staff of field engineers who assist local authorities with their fire problems.

Membership in the Association has always been open to any individual or organization interested. No member is pledged to any course of action, and the only expense is the annual dues according to the class of membership to which the applicant is eligible. Now the Volunteer Firemen's Section furnishes an avenue for the Association to an even wider field of usefulness.

Program of the Volunteer Firemen's Section

At the thirty-seventh annual meeting of the National Fire Protection Association in Milwaukee in May a conference of members enthusiastic about the Volunteer Firemen's Section was held, and at that conference the following five points were set forth as a guide for its organization.

1. The interchange of experience among volunteer fire departments.

2. The development of a medium for broadcasting new developments and new ideas of benefit to volunteer fire departments.

3. The development of standard practices and methods for fire fighting by volunteer fire departments.

4. The promotion of fire prevention work in rural districts.

5. The promotion of the organization of new volunteer fire companies and extension of the service of existing companies where necessary.

CLASSES OF MEMBERSHIP

National Fire Protection Association

Organization Membership

STATE and regional associations of volunteer firemen shall be eligible to organization membership in the National Fire Protection Association and entitled to six votes in the affairs of the Association and four sets of the publications which go regularly to N.F.P.A. members and members of the Volunteer Firemen's Section. — Dues $60 per year.

Membership for Individuals

Any volunteer fireman who so desires may apply for regular membership in the National Fire Protection Association. This entitles him to one vote in the affairs of the Association and a complete set of the publications which go regularly to N.F.P.A. members and members of the Volunteer Firemen's Section. — Dues $10 per year.

Volunteer Firemen's Section

An individual volunteer fireman shall be eligible to membership in the Volunteer Firemen's Section. He shall receive one copy of VOLUNTEER FIREMEN, the monthly journal of the Volunteer Firemen's Section, mailed regularly to his home address. — Dues 50 cents per year.

Because of the very low individual dues a minimum of 20 members from one department or fire company is required. Membership may be applied for by one member of the company or department collecting 50 cents for each of the 20 or more members and making a single remittance for the group, or the company or department may vote to take out membership for its entire roster and make a single remittance from the company or department treasury. In either case the company or department itself is thereby made an eligible member of the National Fire Protection Association and entitled to one vote and full participation in the affairs of the Association. All the literature regularly issued to N.F.P.A. members is mailed to headquarters of the company or department.

The requirement of a minimum of 20 names may make some difficulty for the few departments whose rosters are less than 20. These may make special arrangements. They may send in the minimum remittance for 20 men at 50 cents each and divide this pro rata. This would add only a few cents per man. Another plan which could be worked out in most communities would be to get a number of citizens, interested, but not active members of the department to make up the required 20 for the sake of receiving the interesting material in VOLUNTEER FIREMEN.

Letters to the Editor

National Fire Protection Association,
Boston, Mass.

After a short perusal of VOLUNTEER FIREMEN, it appears to me as being a very fine idea to enlist the volunteer firemen throughout the country for additional help in fire prevention. I believe this will make quite a hit with the volunteer firemen of this state if we can bring it to their attention.

Yours respectfully,

L. J. BUTCHER,
State Fire Marshal, Lincoln, Nebraska

National Fire Protection Association,
Boston, Mass.

I have several copies of Vol. 1, No. 1 of your new VOLUNTEER FIREMEN which I regard as one of the most important additions to the literature in years. Balderdash and twaddle can look to going by the board. Local papers can carry local gossip and find it interesting to the local firemen. Your new paper covers a field so neglected that you have no competition and fills a need so essential that you should build up a subscription list over night for a figure that will stagger the crowd that do not realize that firemen really want just what you plan to give them.

Yours truly,

WILLARD B. HALL, Fruit Hill, R. I.
Chairman, Educational and Fire Prevention Committee,
Rhode Island State Firemen's League

National Fire Protection Association,
Boston, Mass.

It has been my pleasure to correspond with you in the past regarding fire prevention activities and I am pleased to note that you are starting something which will be of great benefit to all volunteer fire departments.

As President of the Oregon Association of Fire Chiefs I am very much interested in anything which will help prevent or extinguish fires and this objective can only be reached by proper education. Your idea in organizing all volunteer fire departments so that they can solve their many problems will, without a doubt, be an important factor in defeating the Fire Demon.

I would appreciate it very much if you would send me all information and data pertaining to the organization of Volunteer Firemen, so that I may be able to answer any question that may arise, and also to assist me in getting all volunteer fire departments in the State interested in the new Association.

Yours very truly,

HENRY J. LECOCQ, President,
Oregon Fire Chiefs Association,
Marshfield, Oregon

National Fire Protection Association,
Boston, Mass.

I very much appreciate receiving the first issue of VOLUNTEER FIREMEN. I think it is a most interesting and most comprehensible compendium of direct appeal and value, first to the firemen; secondly (and not very far behind) to every citizen interested in fire prevention. Indeed, having taken the magazine home and being obliged to lay it down several times on account of interruptions, I threatened to take out a search warrant to ascertain which member of the family took it to his or her room due to its fascinating interest. You are on the threshold of a wonderful work and I am happy to coöperate with you.

Sincerely yours,

EUGENE C. BONNIWELL,
Justice, Philadelphia Municipal Court
Chairman, Executive Committee,
Firemen's Association of the State of Pennsylvania

National Fire Protection Association,
Boston, Mass.

I am certainly pleased to know that a Volunteer Firemen's Section is being organized. There is no doubt that a lot of good can be accomplished through such an organization and I certainly shall mention this in the next issue of our News Letter.

Very truly yours,

THEO. A. ROSENWALD, Secretary,
New Mexico State Firemen's Association, Albuquerque, N. M.

National Fire Protection Association,
Boston, Mass.

I feel deeply interested in the splendid work the N.F.P.A. is doing; it is of such highly beneficial nature that nothing I could say would do justice thereto. In order to show my appreciation I have had President Raney of the State Association assign to me Lieut. R. E. Otto as secretary of my committee. I have also asked Lieut. Otto to take over the work of assisting your organization in this state and I have secured the Lieutenant's assurance that he will do his utmost to bring about complete success. State Fire Marshal Joyce will concur with my recommendation and I trust this arrangement will be agreeable to you.

Sincerely,

C. HOWARD WHITTLE, Baltimore, Md.
Chairman, Committee on Fire Prevention & Inspection
Maryland State Firemen's Association

Defines N. Y. Vamp Shield Law

By Edwin H. Seaman (Member N.F.P.A.)

Chairman, Board of Fire Commissioners, Wantagh Fire District, Inc.

This official insignia in white on a red card 5½ in. x 7 in. in size has been provided by the Wantagh Fire District of Nassau County, New York, to comply with the spirit of the new state law which forbids the display of fire department insignia on volunteers' cars except when actually going to fires. It is arranged to be placed in clips in the windshield where it may be prominently visible when going to fires, but may be concealed at other times. The fireman's number on the badge serves as his identification.

A NEW law became effective in New York State on September 1, 1933 prohibiting the use of fire department, police department or other insignia on private cars when not engaged in actual duty. The District Attorney of Nassau County was asked by the county police and by the several fire districts to define the law which affects the thousands of volunteers in New York State. The opinion states that no person has the right to seek special privileges on the highways by displaying official insignia of any kind on his automobile unless actually engaged in duties given right-of-way privileges by law.

To quote District Attorney Elvin N. Edwards: "No question arises as to the words or lettering on motor vehicles actually owned by a fire department in the county. The only effect of the law as to such vehicles is that, after September 1, it will be a misdemeanor for any person who is not a member or an employee of a duly organized fire department to operate such a vehicle on a public highway.

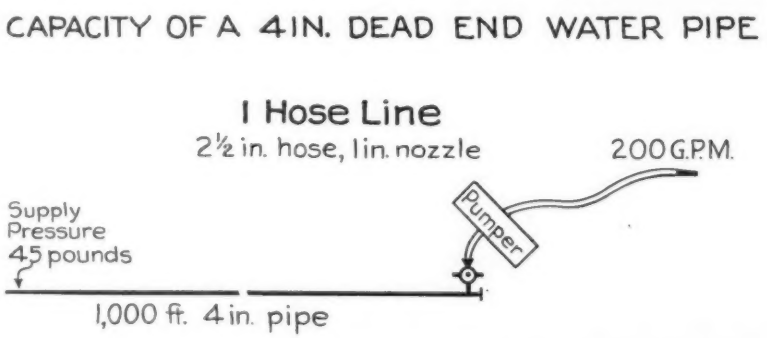
"The chief questions arise with relation to the use of cars privately owned by officers or members of a fire department, but which are used by such private owners from time to time for the purpose of answering fire alarms or attending to other public and official duties. It is my opinion that a fair and reasonable construction of the statute would be that a privately owned car, when being actually used for such a purpose and operated by a member or employee of the fire department, would be for the particular occasion 'used by a duly organized department,' within the meaning of the statute. . . .

"This statute has a definite and necessary purpose. The misuse of official insignia on motor vehicle being operated for purely private purposes has reached serious proportions. The problem affects Nassau County as much as it affects New York City and the other large cities of the state. . . .

"From and after September 1 all permanent lettering or devices must be either removed from privately owned cars or else completely and securely covered on all occasions when the car is not being actually used on official business and actually operated by a member of the department.

"No permanent lettering or device on privately owned cars is necessary for any legitimate fire department purpose. Police department cars not used for regular patrol work and the cars used by the district attorney's staff, carry a small metal plate with plain lettering, which is put temporarily in clips on the windshield whenever needed for official business. This has been found to be fully sufficient.

"It would be a real service for the public if the fire departments throughout the county would adopt such a plate, of distinctive form and design and if the department officials would get together to see that such plate was only in the windshield clips when really needed in an emergency."



One 2½-in. hose line is the practical limit for this layout. Forty-five pounds is an average supply pressure and 1,000 ft. represents a fairly long dead-end pipe. The example provides a point of departure for estimating the number of hose lines which a 4-in. dead-end pipe can supply. Two lines can be obtained from a 4-in. dead-end pipe only if the supply pressure is high (90 pounds or better) or if the dead end is much shorter (under 360 ft.).

FRICTION OF WATER IN PIPES

(From Hazen and Williams Hydraulic Tables)

Friction losses are 50 per cent greater than those given if the pipe is 10 to 15 years or more in age, and 100 per cent greater in case of pipes badly corroded or internally incrustated.

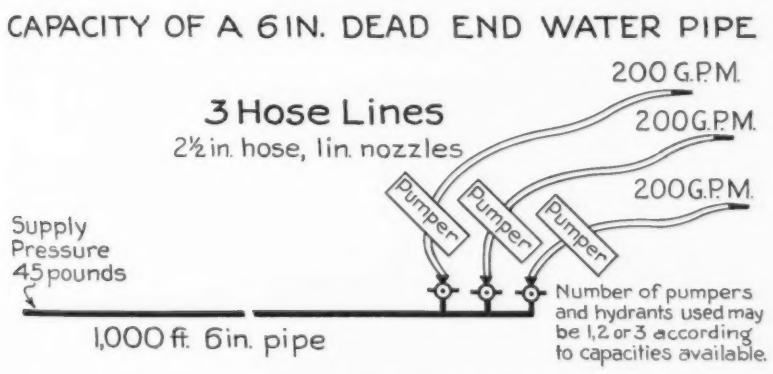
Number of Hose Streams (2½-in. hose, 1-in. nozzles)	Equivalent Flow in G. P. M. (gals. per min.)	Loss in Pounds per Sq. In. for Each 100 ft. of Clean Iron Pipe			
		4-in. pipe	6-in. pipe	8-in. pipe	10-in. pipe
1	200	1.91	0.26		
2	400	6.95	0.96	0.23	0.08
3	600	14.7	2.03	0.50	0.17
4	800		3.45	0.85	0.29
5	1,000		5.2	1.29	0.43

Dead-End Water Supply Pipes

Some Approximations Which Make It Easy to Estimate Number of Hose Lines They Can Supply

AT AN eastern fire department school one man stepped to the blackboard and spent 20 minutes covering it with a mass of figures to show how he calculated the hydraulics of a certain arrangement of pumpers and hose. Another member of the class took exception to this. "You wouldn't do all that figuring at a fire," he declared.

He was right. In the field, at fires, there is no time to consult friction loss tables or to do involved arithmetical calculations. The fire officer must depend on certain approximations which enable him to make estimates of what layouts will work. This is possible because he knows from experience that certain layouts will work under certain conditions and he uses these as points of departure from which to make an intelligent guess as to what layouts are necessary for slightly differing conditions.



Three 2½-in. hose lines are the practical limit for this layout. With this layout in mind, however, an intelligent estimate can be made of the number of hose lines which a 6-in. dead-end pipe can supply under different conditions. If the supply pressure is appreciably lower than the 45 pounds assumed average, only two lines can be supplied. If the supply pressure is about 10 pounds higher an additional line (a total of 4) can be fed, and if the supply pressure is high (72 pounds or better) a total of 5 lines can be supplied. If the dead end is shorter (not over 725 ft. long) 4 lines can be supplied. If under 480 ft., 5 lines.

Two layouts are illustrated here which are practical points of departure for estimating the number of ordinary 2½-in. hose lines which can be supplied from 4-in. and 6-in. dead-end water pipes. Dead-end water supply pipes are a real problem to fire fighters in most communities which have water systems. The 4-in. and 6-in. sizes are so limited in capacity that special care must be taken not to place more pumpers in suction at hydrants on these pipes than the pipes can supply.

The capacity of these dead ends is usually greatly reduced with age, as they fill up with sediment and incrustations form on the pipe walls. Four-inch and 6-in. water pipes in service 10 or 15 years show increases in friction losses up to 50 per cent above the values in the case of new, clean pipe. Under bad conditions the losses may be doubled by the reduced inside diameter of the pipe. The examples given above presuppose fairly new clean pipe. If the pipe is old, it should be assumed that the capacity would be reduced by at least half. The 4-in. pipe would not feed even 1 line under those conditions and the 6-in. would feed only 1 or 2 lines.

As a standard hose line, one of 200 gallons of water per minute capacity has been selected. With 2½-in. hose this line is one obtained with a 1-in. nozzle and a nozzle pressure of approximately 50 pounds. These round numbers obtained by this combination help to make calculations at fires easy. (This is a slightly smaller capacity line than the fire line customarily referred to in fire department practice in big cities and in industrial fire protection work. For the latter a 250 G.P.M. line has been used as a standard. This calls for higher nozzle pressures and is obtained by using a 1⅛-in. nozzle tip. It is less well adapted for volunteer fire department use than the line using approximately 200 G.P.M. at 50 pounds nozzle pressure with a 1-in. nozzle. It is necessary to mention this difference for the benefit of readers who may have been using the larger stream in their calculations or approximations.)

In the examples cited, the *hose* layouts are of no special significance. Assuming that pumpers are available and of adequate capacity, it is only necessary to run them at a pressure sufficient to deliver about 50 pounds at the 1-in. nozzles which will mean the streams will be delivering about 200 G.P.M.

Calculations

The time to do arithmetic is at a time like this when attempting to fix in mind typical situations and the effect of varying conditions. For those interested, the limits of the layouts on the dead-end supply pipes can be readily calculated as indicated following. The table of friction losses needed to make these calculations is given herewith. (Values for 8-in. and 10-in. pipe are included for those who wish to see how many more fire lines these larger pipes will supply as compared to 4-in. and 6-in. dead-end pipes.)

Friction Losses. A pressure or pushing force is needed to make water move through a pipe. This force is used up by having to act against the friction of the water passing through the pipe. The more water moving, the greater is the friction loss. These friction losses have been determined by actual test and are given in the accompanying table to assist the calculations.

Minimum Hydrant Pressure. The examples illustrated start with 45 pounds at the supply end of the pipe. Theoretically, all of this can be used up in friction losses (so that the pressure at the hydrant is zero) and still provide suction to a pump. As a practical matter, some pressure should be left at the hydrant to overcome losses in the pumper connections and suction lines. For average conditions a minimum hydrant pressure of 20 pounds is desirable and it has become customary to use that figure in making calculations such as the following.

4-in. Dead-End Pipe. With 200 G.P.M. flow, pressure used up or lost due to friction between supply and hydrant is 1.91 pounds (per sq. in.) per 100 ft. of pipe (see table). Since there is 1,000 ft. of pipe, the friction loss is 10

multiplied by 1.91 or 19 pounds. Thus the pressure at the hydrant would be 45 minus 19, or 26 pounds which is enough to provide pumper suction.

If flow is 400 G.P.M. (two 2½-in. hose lines) the friction loss between supply and hydrant will be 6.95 pounds per 100 ft. (from table) or 10 x 6.95 = 69.5 pounds. To allow for this loss and to provide a minimum of 20 pounds at the hydrant, the supply pressure must be 69.5 plus 20, or practically 90 pounds. With supply pressure of 45 pounds a maximum friction loss of 25 pounds between supply and hydrant can be tolerated and still leave 20 pounds at the hydrant. With 400 G.P.M. flow, friction loss will be 6.95 pounds per 100 ft. (from table). Loss of 25 pounds will occur in a number of hundred feet determined by dividing 25 by 6.95 which equals 3.6, or 360 ft.

6-in. Dead-End Pipe. With 600 G.P.M. (3 2½-in. hose lines) flowing, friction in the pipe uses up 2.03 pounds per 100 ft. (see table). This amounts to 10 x 2.03 or 20 pounds. With a supply pressure of 45 pounds this leaves only 25 pounds at the hydrants to provide for the pumper's suction.

With 400 G.P.M. flow (2 lines), friction loss in the pipe is only 10 x 0.96 (from table) = 9.6 pounds, so two lines can be fed if the supply pressure is not below 20 (the minimum hydrant pressure necessary) plus 9.6, or practically 30 pounds.

With 200 G.P.M. flow (1 line), friction loss would be only 10 x 0.26 (from table), or 2.6 pounds. One line therefore can be fed if the supply pressure is not below 20 plus 2.6, or practically 23 pounds.

With 800 G.P.M. flow (4 lines), friction loss would be 10 x 3.45 (from table), or 34.5 pounds, so that the supply pressure must be 20 (the hydrant minimum) plus 34.5, or 54.5 pounds. This is only about 10 pounds above the assumed average supply pressure of 45 pounds. With 800 G.P.M., friction loss (from table) would be 3.45 pounds per 100 ft. of pipe. With 45 pounds supply pressure and a 20 pounds minimum hydrant pressure there is a leeway of 45 minus 20, or 25 pounds which can be used up in friction losses and still make possible the feeding of 4 lines (800 G.P.M.). Loss of 25 pounds will occur in a number of hundred feet determined by dividing 25 by 3.45 which gives 7.25. Multiplied by 100 this gives 725 ft.

With 1,000 G.P.M. (5 lines) the calculations will be as follows. Friction loss 10 x 5.2 (from table) = 52 pounds. Supply pressure would need to be 20 plus 52, or 72 pounds. Length of pipe, 25 divided by 5.2 equals 4.8. Multiplied by 100 this is 480 ft. for the length of the dead-end pipe.

Regular N.F.P.A. Publications

Volunteer fire companies enrolling 20 or more members in the Volunteer Firemen's Section will receive at their home address each month a copy of **VOLUNTEER FIREMEN,** the professional journal of the section.

In addition the company itself will receive the publications described below which are regularly issued to members of the N.F.P.A. These contain valuable and authoritative material, including illustrated reports on important fires, the technique of fire fighting and fire prevention.

Quarterly Magazine. A chronicle of the Association's activities, with valuable articles covering a wide range of matters relating to fires. These are prepared by leading authorities and cover such subjects as municipal and rural fire departments, latest results of fire research, methods of dealing with special fire hazards, including flammables and explosives, and reports of conflagrations and interesting fires.

Proceedings of Annual Meeting. A stenographic record of the transactions of the Association and the discussions incident to the receipt of the reports of its technical committees and adoption of its standards.

News Letter. A monthly bulletin to inform members of the latest developments in the fire field. Many publications other than those of the Association are rendered available to members through this medium. (Twenty-two important publications last year.)

Year Book and Directory. Complete list of members with addresses. Arranged alphabetically and geographically.

Index to subjects covered in the Printed Records. (Proceedings, Quarterly, etc.)

Committee Reports. Thirty-seven technical committees make regular reports to the Association. These are printed and made available to members for discussion prior to their being adopted by the Association.

Special Bulletins. Numerous special bulletins are mailed to members from time to time. These cover a wide variety of topics. Typical subjects covered are successful fire prevention campaigns and special reports on major conflagrations.

Educational Material, Posters, Etc. Educational literature, posters and pamphlets for the use of members are prepared, including a special budget of material for Fire Prevention Week observances.

Special Information Service

Members are privileged to write the Executive Office for information on their special problems. Much material other than that published is thus made available to members from the extensive files and library built up over a period of 37 years.

Executive Office

NATIONAL FIRE PROTECTION ASSOCIATION

60 Batterymarch Street, Boston, Massachusetts

PRINTED IN U.S.A.